# University of Glasgow engineers launch initiative to revolutionise 6G wireless communications



Engineers from the University of Glasgow are collaborating with experts from the Tyndall National Institute's Wireless Communications Laboratory (WCL) on a groundbreaking initiative aimed at advancing wireless communication technologies. This endeavour, named Active intelligent Reconfigurable surfaces for 6G wireless COMmunications, or AR-COM, seeks to enhance smart materials known as intelligent reconfigurable surfaces (IRS), which are anticipated to play a significant role in the development of ultrafast 6G wireless networks.

The project, which spans a three-year timeline, is set to innovate materials and methodologies to maximise the capabilities of IRS technologies, particularly within the millimetre-wave and terahertz bands of the communications spectrum. IRS have the unique ability to intercept weak wireless signals in both indoor and outdoor environments, actively guiding them to connected devices. This function not only bolsters the strength of the signals but also optimizes performance, a vital feature as the demand for improved indoor wireless connectivity continues to rise. Such advancements may lead to better mobile reception in buildings with previously inadequate coverage, more dependable high-speed internet connections, and the facilitation of new 6G applications that necessitate exceptionally reliable wireless connections.

The AR-COM project is part of a broader research initiative focused on 6G at the University of Glasgow's Communications, Sensing and Imaging (CSI) hub. Professor Qammer H. Abbasi, the director of the CSI Hub and principal investigator for AR-COM, remarked, “Current materials used in wireless communications face significant limitations, especially at the higher frequencies that 6G networks will require. With AR-COM, we’re building on the expertise of the University of Glasgow and the Tyndall Institute with the support of key industry partners to develop truly next-generation technologies.”

The project will undertake research and development, initially concentrating on the creation of advanced switches made from transition metal oxides (TMOs). These switches aim to allow precise and rapid management of wireless signal strength. Following this, the project will investigate the movement of signals through meticulously crafted layers of metal and TMO materials, leading to the development of miniature signal amplifiers designed to strengthen weakened signals while consuming minimal power.

Ultimately, these advancements will culminate in the construction of a fully operational IRS system, capable of manipulating wireless signals without signal loss and with minimal latency, thereby enhancing signal quality even in challenging environments.

Professor Muhammad Imran, project co-investigator and head of the James Watt School of Engineering, stressed the importance of IRS in addressing the complexities of delivering robust 6G networks and facilitating next-generation wireless applications. He noted, “Ultrafast, ultra-low latency wireless networks will underpin new forms of communication and sensing that will transform how we interact with each other in the years to come."

The AR-COM project has secured £1 million in funding from UK Research and Innovation’s Engineering and Physical Sciences Research Council (EPSRC) and additional support of €500,000 (£414,675) from Research Ireland. The project is also supported by a consortium of industry partners, including Ericsson Silicon Valley, Nokia, Samsung Electronics UK Ltd, Virgin, and Analog Devices Inc (UK).

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Corroborates the collaboration between the University of Glasgow and the Tyndall National Institute's Wireless Communications Laboratory on the AR-COM project to advance 6G wireless communications.
2. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Details the focus on improving intelligent reconfigurable surfaces (IRS) for ultrafast 6G wireless networks, particularly in the millimeter-wave and terahertz bands.
3. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Explains the ability of IRS to intercept and guide weak wireless signals, enhancing signal strength and performance.
4. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Mentions the AR-COM project as part of the broader research initiative at the University of Glasgow's Communications, Sensing and Imaging (CSI) hub.
5. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Quotes Professor Qammer H. Abbasi on the limitations of current materials and the goal of developing next-generation technologies with AR-COM.
6. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Describes the initial research focus on creating advanced switches using transition metal oxides (TMOs) for precise and rapid control over wireless signal strength.
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8. <https://www.gla.ac.uk/news/headline_1138103_en.html> - Confirms the collaboration between the University of Glasgow and the Tyndall National Institute, along with the support from key industry partners for the AR-COM project.
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11. <https://arxiv.org/pdf/2011.04300.pdf> - Provides a detailed academic perspective on reconfigurable intelligent surfaces (RIS) for 6G systems, including their principles, applications, and research directions.
12. <https://www.digit.fyi/glasgow-engineers-collaborate-on-6g-wireless-innovation-drive/> - Please view link - unable to able to access data